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SYSTEM ENGINEERING OF THE SONAR NOISE AND SOURCE LEVEL METER, M--ETC(U)

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U. S. NAVY UNDERWATER SOUND LABORATORY
FORT TRUMBULL, NEW LONDON, CONNECTICUT

SYSTEM ENGINEERING OF THE SONAR NOISE & SOURCE LEVEL METER, MODEL I.

By

10 V. L. WARD

USL Technical Memorandum No. 1230-70-58 ✓

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INTRODUCTION

The Sonar Noise & Source Level Meter, Model 1, is a dual purpose instrument. It provides an absolute measurement of the noise level of the ship as seen in the sonar at any time and for any set of operating conditions. It also measures the source level of the sonar in terms of the output of the sonar transmitter. By comparing the measured values to those which are normal for a given ship and sonar system, the need for corrective maintenance may be determined.

The design of the meter has been tailored for use with the AN/SQS-4 Sonar, however, it can be used with other sonars if their outputs are equivalent to those provided by the AN/SQS-4 Sonar.

SYSTEM ENGINEERING OF THE EQUIPMENT

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The Sonar Noise & Source Level Meter, Model 1, is composed of a Cathode Follower Unit, a Voltage Divider Unit, and a Sonar Noise & Source Level Meter Unit. The physical layout is best described by referring to Figures 1 through 4; the circuits and the calibration procedures are described in detail in Ref. (a). The design is such that it can serve as a model for production purposes. Drawings have been forwarded to BuShips for use in negotiating for the manufacture of a number of such meters.

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There are only three operational controls on the meter, namely, power switch, noise level - source level selector switch, and noise level attenuator. The meter is common to both the noise level and the source level measurements. Indicating lights are provided to assist the operator in determining which mode of measurement is in operation.

The noise level for any particular bearing of the sonar listening beam can be measured by a very simple procedure. The operator merely selects the noise level mode of operation and then adjusts the calibrated attenuator until the pointer on the meter is centered over the red mark which is located at the center of the meter face. He then reads the setting of the attenuator. This is a measurement of the self-noise level and may be compared to what is normal for the particular ship and

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operating speed. Surrounding the attenuator dial is a colored scale which indicates acceptable and unacceptable noise levels for ship speeds of 12, 15 and 18 knots. If the pointer of the attenuator lies in the red region of the scale, for a given ship's speed, the sonar is too noisy; the yellow region indicates an acceptable noise level; the green region indicates a desirably quiet condition. The colored scale has been made adjustable with respect to the attenuator db scale to allow for different sonar operating frequencies. A set screw located behind the front panel prevents this scale from turning with respect to the attenuator db scale; the set screw must be loosened before making an adjustment and must be reset after the adjustment has been made. An Allen wrench is provided for this purpose; it is located inside the front panel.

The source level can be measured by selecting the source level mode of operation, setting the sonar to the transmit mode of operation, and then reading the 105 to 125 db scale on the meter.

The following photographs and drawings have been prepared on the meter:

Photographs

NP24-16469-3-58	Sonar Noise and Source Level Meter, Model 1
NP24-16470-3-58	Right Side of Sonar Noise and Source Level Meter, Model 1, Interior
NP24-16471-3-58	Left Side of Sonar Noise and Source Level Meter, Model 1, Interior
NP24-16472-3-58	Sonar Noise and Source Level Meter, Model 1, Cathode Follower and Voltage Divider

Circuit Diagrams

Drawing No. E-41051-C	Noise and Source Level Meter Mod. 1
E-41063-B	Modification to AN/SQS-4 for Sonar Noise and Source Level Meter
E-41064-B	Interconnection Diagram, Sonar Noise and Source Level Meter to AN/SQS-4
E-40049-A	High-Pass Filter 5k Ohm
E-40050A	Cathode Follower
E-41046-B	Meter Dial

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41681-D Assembly Noise and Source Level Meter, Model 1
41682-E Chassis
41683-E Assembly, Chassis
41684-E Cabinet
41685-A Identification Disk
41686-A Identification Disk
40347-B Dial - Outer Part
40348-A Dial - Inner Part
40349-A Pointer-Knob
40350-A Spacer-Knob
40351-B Assembly High-Pass Filter - Fk Ohm
40352-C Mounting Board - Assembly
40353-A Mounting Board
40355-A Cover - Modified
39997-B Assembly-Cathode Follower
39998-A Mounting Plate
41702-A Adapter Body
41703-B AN/SQS-4 RCVR Adapter for Sonar Noise & Source Level
Meter (Assembly)

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SK-33045 Outline Drawing for Sonar Noise & Source Level Meter
and Cathode Follower

V. L. Ward
V. L. WARD
Electronic Technician

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LIST OF REFERENCES

- (a) D. W. Holloway, "Development of Sonar Noise & Source Level Meter, Model 1", USL Technical Memorandum No. 1230-036-58, 21 Jan. 1958,
(CONFIDENTIAL)



Fig. 1 Sonar Noise and Source Level Meter, Model 1

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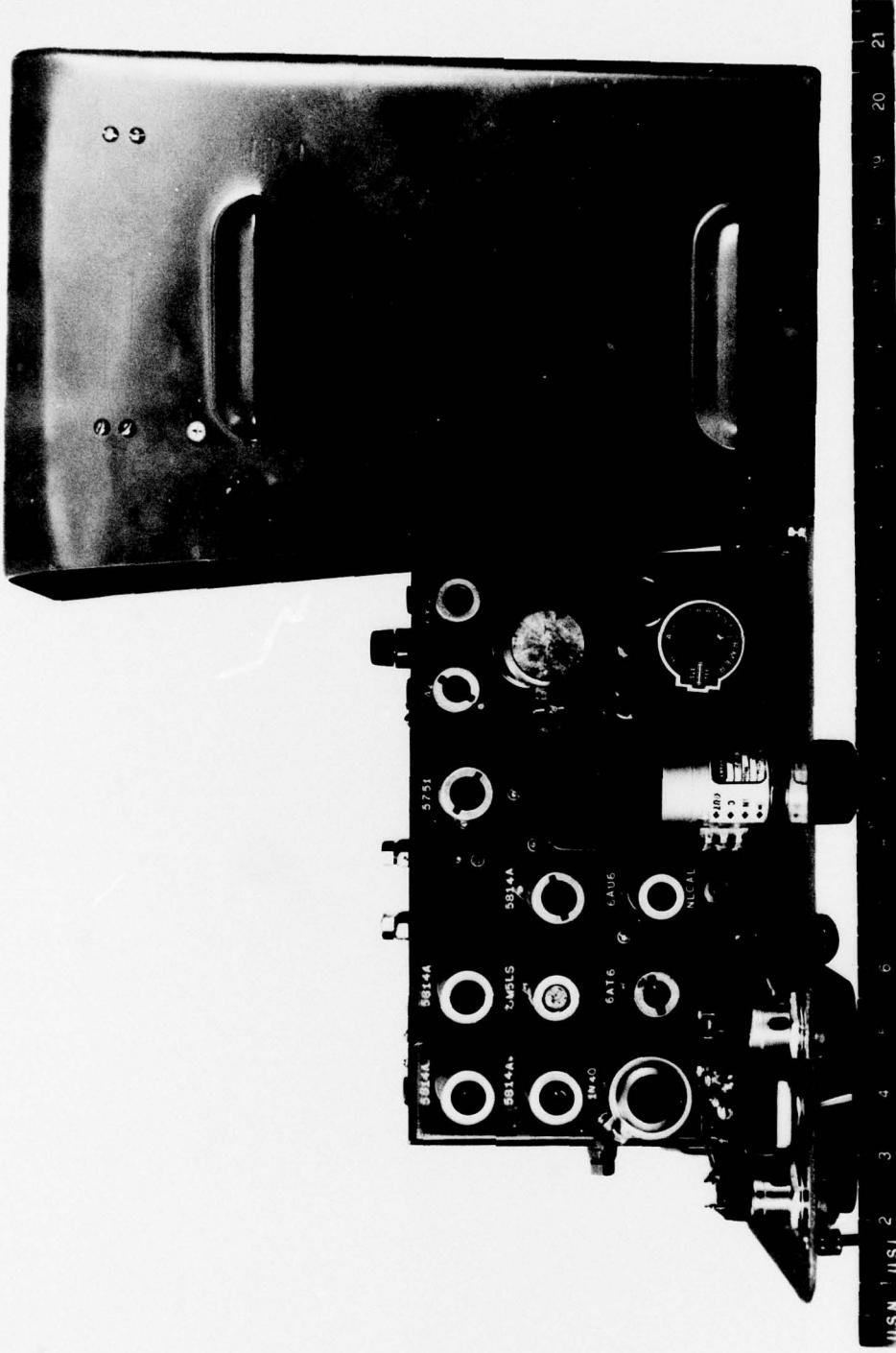


Fig. 2 Right Side of Sonar Noise and Source Level Meter, Model 1, Interior

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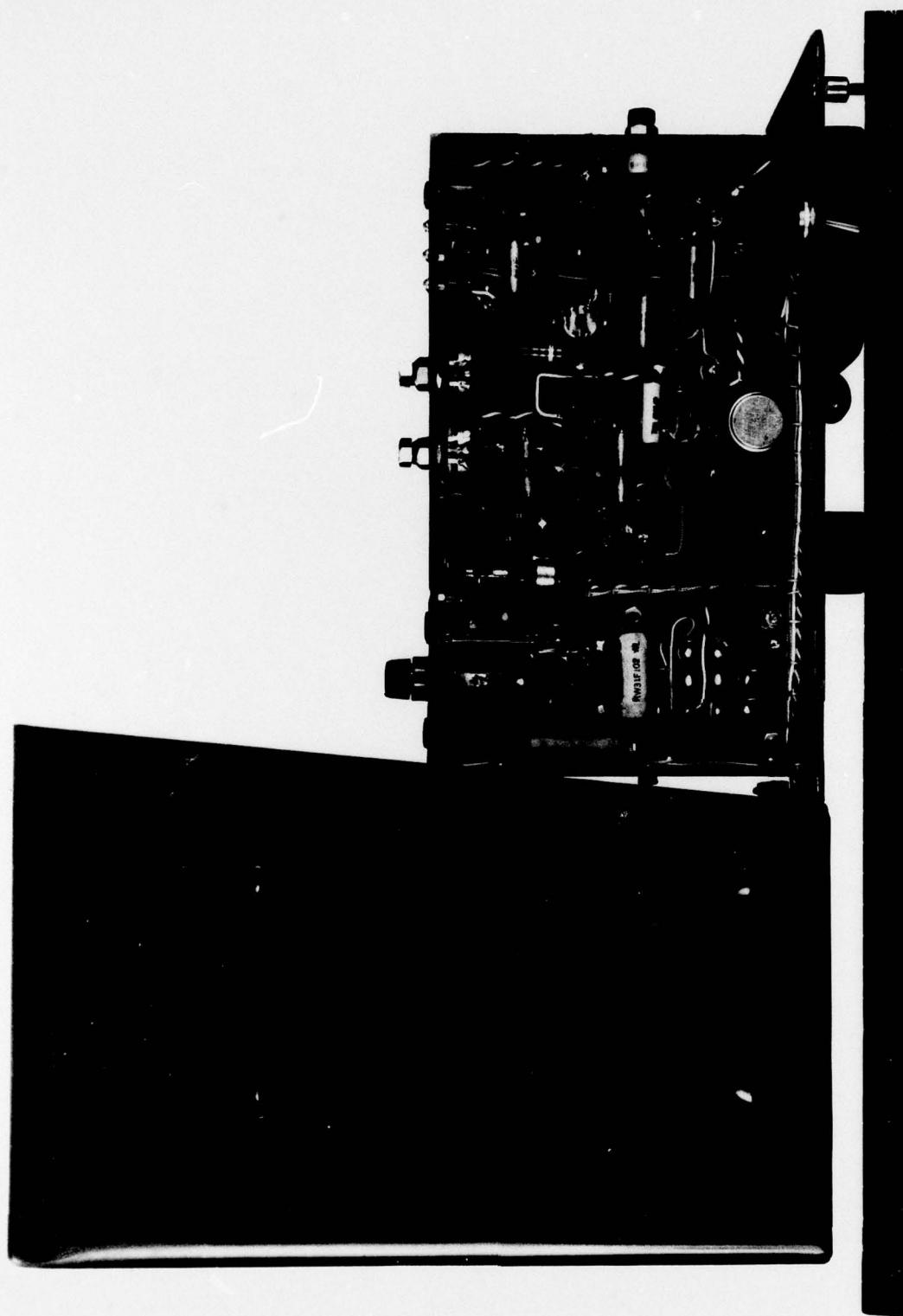


Fig. 3 Left Side of Sonar Noise and Source Level Meter, Model 1, Interior

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Official Photograph

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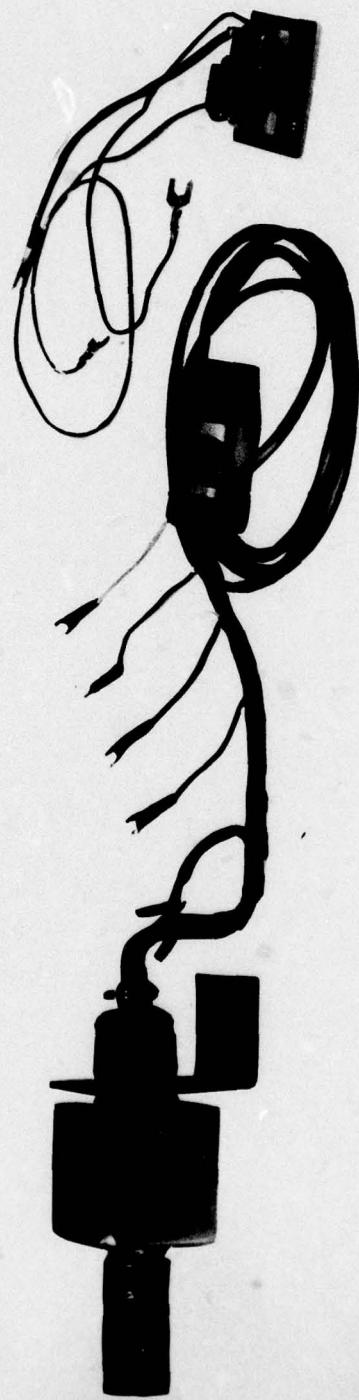


Fig. 4 Sonar Noise and Source Level Meter, Model 1 - Cathode Follower
and Voltage Divider

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